

A Finely Crafted Unit 5 Opportunity Day

Technology Section: You may use a calculator, Geogebra, and the matrix calculator. Use a pencil. Show all work and circle your answer. Use your time wisely; you will be able to earn additional credit after the timed portion of the test by completing Supercorrections. When you finish, put away your technology and you can come up to get the non-technology part—you may continue to work on both sections without the aid of technology.

Bonus. Write down the quadratic formula. If you're not sure if you are correct, raise your hand, and I will check your answer and correct it if necessary.

1. Go to ThatQuiz and answer the questions.

_____ out of 4

2. Use factoring to solve $0 = 2x^2 - 12x + 16$ (Hint: considering the GCF will make your working easier!)

3. Find all the integers that satisfy the inequality.

$$-x^2 + 6x \geq 8$$

4. There is a quadratic function that fits the points $(-2, -7)$, $(1, 2)$, and $(-1, -2)$ exactly.

a. Find it in Geogebra by inputting the points and then typing FitPoly[A,B,C,2].

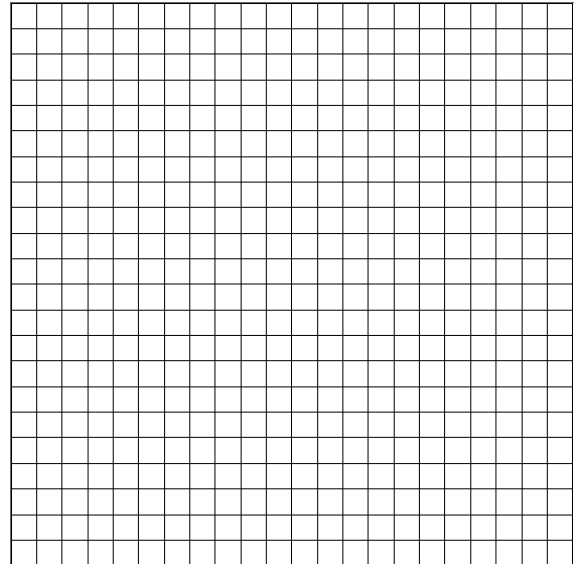
b. Find it by writing a system below and then using one of the online matrix calculators to solve it.

5. Jordan bets Bekah she can't find a number that when squared and added to twice itself is 7. Bekah says that not only can she do that, but she can find two such numbers! This is how:

- Bekah needs to solve the equation $x^2 + 2x = 7$. Find the values of a , b , and c that she will substitute into the quadratic formula.
- Use the quadratic formula to solve $x^2 + 2x = 7$. Give your answers to 3 decimal places.
- Check your answer from the previous question by squaring your answer and adding it to twice itself (i.e. find $x^2 + 2x$). Does it equal 7?

6. Using $f(x) = 2(x - 3)^2 - 2$, find the following information and graph the function. Be sure to label your axes with numbers!

- Write the coordinates of the vertex.
- Write the equation of the axis of symmetry.
- Write the y -intercept.
- Write the x -intercepts.



7. Solve any way you'd like.

$$x^2 - 8x = 9$$

8. Factor each expression.

a. $3x^4 + 21x$

b. $x(a+b) - 2(a+b)$

9. Solve $(x+2)^2 = -9$ and write your answers in the form $a+bi$.

10. Courtney needs to factor $x^2 - 10x + 24$. She gets the answer $(x+12)(x-2)$.

a. Multiply and simplify $(x+12)(x-2)$.

b. How does the answer to part a. show that Courtney has made a mistake in her factoring?

c. Factor $x^2 - 10x + 24$ correctly.

11. Solve each equation.

a. $x^2 - 9 = 0$

b. $w^2 - 6w = 0$

12. Here are the first several lines for solving $5 - x^2 = 6x$ by using completing the square. Fill in the 4 blanks and then solve for x at right.

$$5 - x^2 = 6x$$

$$5 = x^2 + 6x$$

$$5 + \underline{\hspace{2cm}} = x^2 + 6x + \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} = (x + \underline{\hspace{2cm}})^2$$

13. Consider the complex numbers $2 + i$ and $1 - 4i$. Add, subtract, multiply and divide them below.

a. $(2 + i) + (1 - 4i)$

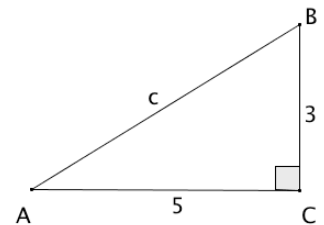
b. $(2 + i) - (1 - 4i)$

c. $(2 + i)(1 - 4i)$

d. $\frac{2 + i}{1 - 4i}$

14. Consider the right triangle below.

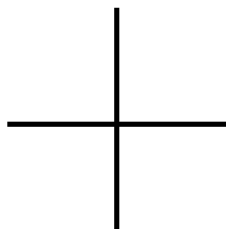
a. Find the unknown length.



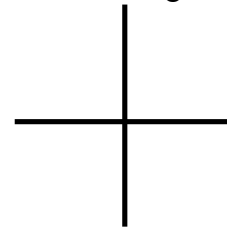
b. Explain how your answer in part (a) helps you find $|-5 + 3i|$.

15. Sketch a quadratic function $f(x) = ax^2 + bx + c$ that has the following:

a. positive a value and zero discriminant



b. negative a value and negative discriminant



Go back and check your answers- the fewer Supercorrections, the better!